Advanced: Plenty of Planaria

Overview

Students will begin an investigation into the role of proliferation and differentiation in the regeneration of Planaria (flatworms). This investigation was created by the Northwest Association for Biomedical Research (NWABR) as part of its stem cell research and ethics curriculum. The complete experiment can take two weeks, and it is the best model system available to examine regenerative capacity and how stem cell function is highly conserved across phyla. The Planaria lab investigation addresses the **Next Generation Science Standards (NGSS) Performance Expectation HS-LS1-4**. View the standards that apply to this unit.

Access the Planaria Lab Investigation here

Amazingly, adult pluripotent stem cells called neoblasts underlie the regeneration of Planaria. Students should first become familiar with the anatomy, habitat, and behaviors of Planaria and then learn how to culture them. The "Planaria Intro Powerpoint" and the "Plenty of Planaria Student Background," as well as several readings below, provide this information.

EASY background reading
MID background reading with videos
Background reading and worksheet

Important Terminology
See the "Plenty of Planaria Teacher Overview."

Outline of Lesson

Discussion of homework
Students can show each other their breast cancer development drawings in groups.

1. Group representative explains 1-2 drawings to the class.

Northwest Association for Biomedical Research: Plenty of Planaria lab (1-2 weeks)

1. Teacher overview
2. Student research project

Students may choose to design their own experiments, test their hypotheses, and present their results at the conclusion of the study. The beginning of the "scientific method" involves brainstorming, asking questions, and forming a hypothesis. The careful design of experiments to test a hypothesis is characteristic of a scientist, so students should provide an outline of their proposed experiment for teacher modification and approval. Students must take detailed lab notes and be responsible for showing how they analyzed their data. Those taking math or statistics can provide a detailed analysis, as a researcher would when publishing results.

Ideas for experiments:

1. What common substances and chemicals influence the regeneration of planaria?
    a. Lipoic acid…
2. Does temperature affect planaria regeneration?
3. Does growing the planaria in moving water (like in a stream) affect regeneration?
